



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/520,472

04/07/2005

Stefan Holler

5083-47PUS

6529

27799

7590

04/09/2009

COHEN, PONTANI, LIEBERMAN & PAVANE LLP  
551 FIFTH AVENUE  
SUITE 1210  
NEW YORK, NY 10176

EXAMINER

SUITTE, BRYANT P

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

04/09/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/520,472	<b>Applicant(s)</b> HOLLER ET AL.	
	<b>Examiner</b> BRYANT SUITTE	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Art Unit: 1795

**FUEL CELL STACK COMPRISING A COUNTERFLOW COOLING SYSTEM AND A  
PLURALITY OF COOLANT-COLLECTING DUCTS LOCATED PARALLEL TO THE  
AXIS OF THE STACK**

Examiner: Suitte

10/520,472

August 30, 2008

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 13, 2009 has been entered. Claims 12-33 remain pending. Claims 1 and 23 have been amended. Claims 1-11 have been canceled.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 112***

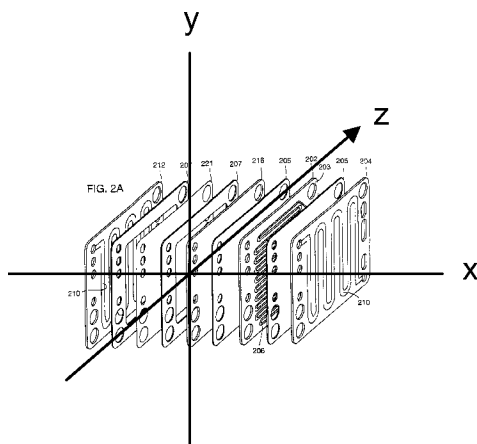
3. The claim rejections under 35 U.S.C. 112 as being insufficient antecedent basis for this limitation in the claims 19 and 25 is withdrawn because applicant argument was persuasive.

***Claim Rejections - 35 USC § 102***

4. The claim rejections under 35 U.S.C. 102(b) as being anticipated by Vitale et al. (US 6,066,408) is withdrawn because claim 12 was amended.

5. Claims 12-17, 20, 23 and 28-33 rejected under 35 U.S.C. 102 (b) as being anticipated by Vitale et al. (US 6,066,408).

Regarding claims 12, 28 and 29, Vitale teaches a proton exchange membrane fuel cell stack that comprises a membrane electrode assembly and a plurality of cooling channels (206, 206') between adjacent membrane electrode assemblies. See figure 2a and 6. The cooling channels comprise a serpentine configuration (a direction of flow of one of said channels is opposite to a direction of flow of an adjacent one of said channels). See figure 6. Each channel having two open ends (206, 206', 614, 618). See figure 6. Vitale does not disclose an axis for the fuel cell stack. However, an axis is based upon the plane of reference. Therefore, it can be concluded that the fuel cell stack is stacked along the x-axis and the cooling channels disclosed in figure 6 extend transversely to the stack axis in the z-axis direction. See figure 6.



Regarding claim 13, Vitale teaches an inlet and outlet for cooling channels of the said fuel cell stack. The inlet and outlet for cooling channels are arranged one above another in a stack formation aligning the said fuel cell stack manifolds. While the examiner recognizes that the reference does not recite common conductor collector per se, it is however, the perception of the examiner that since the said fuel cell cooling plates comprise manifold inlets and outlets, it necessarily means that the manifolds operate as common conductor collectors. See figure 2A, 2B, 6 and column 7 lines 8-20.

Regarding claim 14, Vitale teaches of a plurality of manifolds, as stated in the above paragraph to be common collector channels, are arranged in parallel on two sides of said fuel cell stack that allow for the inlet and outlet channels to communicate by aligning the holes in the various fuel cell plates. See figure 2A, 2B, 6 and column 7 lines 8-20.

Regarding claim 15, Vitale discloses a fuel cell stack cooling channels are utilized exclusively for cooling said fuel cell. See figure 6 and column 9 lines 15-20.

Regarding claims 16 and 17, Vitale teaches a fuel cell stack wherein electrode assemblies comprises an anode electrode and a cathode electrode, wherein said channels are open toward said anode electrode and conduct a fuel supply toward aside anode electrodes. See figure 2A, 2B and 2C.

Regarding claim 20, Vitale discloses an open end exhaust channel (262) (common collector channel). See figure 2C.

Art Unit: 1795

Regarding claim 23, Vitale teaches a square fuel cell stack that has an axis through the center of stack that is parallel to the common collector channel (606). See figure 6.

Regarding claim 30, Vitale discloses a fuel cell stack comprising two open ends is formed on two different sides of the fuel cell that are inlet and outlet (264, 268, 250, and 262). See figure 2C.

Regarding claims 31, 32 and 33, Vitale discloses a fuel cell stack comprising two open ends is formed on two different sides of the fuel cell that are inlet and outlet (264, 268, 250, and 262). See figure 2C. The inlet and outlet open ends alternate between inlet and outlet ends are located on opposite's ends of the fuel cell. See figure 2C.

### ***Claim Rejections - 35 USC § 103***

6. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Vitale et al. (US 6,006,408) as applied to claims 12-17, 20, 23 and 28-33 above, and further in view of Koschany (US 2003/0012986) on claims 18, 22, 24, and 26 is maintained. The rejection is repeated below for convenience.

Regarding claims 18 and 24, Vitale discloses a channel width; however the width is not less than 3 mm.

Koschany teaches that an air cooled fuel cell stack comprises cooling channels with a width of 1.0 mm. See paragraph 30 and 29. The 1.0 mm width cooling channels allows for the dispersion of oxygen. Therefore it would be obvious to one of ordinary skill in the art to utilize the 1.0 mm width cooling channels with the fuel cell stack of

Art Unit: 1795

Nelson because Koschany teaches the even distribution of oxygen to sufficiently cool the cathode structure.

Regarding claims 22 and 26, the disclosure of Koschany differs from Applicant's claims in that Koschany does not disclose a fuel cell stack cooling channel with a pressure of 0.1 to 10 bar. However, Koschany recognize the pressure of the cooling channel is determined by the size and power output of each fuel cell stack. See paragraph 54 last sentence. Therefore, it would have been within the skill of the ordinary artisan to adjust the size and power output of the fuel cell stack to reach a pressure of 0.1 to 10 bar. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art. In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215.

7. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Vitale et al. (6,006,408) as applied to claims 12-17, 20, 23 and 28-33 above, and further in view of Shelekhin et al. (5,972,530) on claims 19 and 25 are maintained. The rejection is repeated below for convenience.

Regarding claims 19 and 25, Vitale discloses a fuel cell stack comprising cooling channels; however, Vitale does not teach cooling channels with a length in the range of 20 mm to 200 mm.

Shelekhin teaches an air cooled fuel cell stack having cathode and anode fluid flow plates with a height of 10 to 750 mm. See column 3 lines 53-55. It is the position of the examiner that the cooling channel must be equal to the cathode and anode fluid flow plates to adequately fit the construction of the fuel cell stack. Therefore it would be

Art Unit: 1795

obvious to one ordinary skill in the art to utilize the height requirements of Shelekhin with the fuel cell stack of Vitale because Shelekhin teaches the height is dependent on the power requirements and space available of the fuel cell stack.

8. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Vitale et al. (US 6,006,408) as applied to claims 12-17, 20, 23 and 28-33 above, and further in view of Nelson (US 6,689,500) on claims 21 and 27 is maintained. The rejection is repeated below for convenience.

Regarding claim 21, Vitale discloses a fuel cell stack; however a sealing edge surrounding a bipolar plate is not disclosed.

Nelson teaches the fuel cell stack has a gasket that seals the edge surrounding a bipolar plate of said fuel cell. The bipolar plate with the sealing edges is arranged between adjacent fuel cells, with the common collector channel being formed by recesses in said sealing gaskets. See figure 1. Therefore, it would have been obvious to one of ordinary skill in the art to utilize the sealing gaskets with the bipolar plate of Vitale because Nelson teaches the gaskets keep gases from leaking from the manifolds. See column 5 lines 65-67.

Regarding claim 27, Vitale discloses a fuel cell stack; however an enclosure along an edge of a fuel cell is not disclosed.

Nelson teaches the fuel cell stack with a common collector channel is formed by an enclosure along an edge of said fuel cell. See figure 1. Therefore, it would have been obvious to one having ordinary skill in the art to utilize



Art Unit: 1795

a common collector along the edge of the fuel cell of Vitale because Nelson teaches directs the humidified air from the coolant outlet manifold to the cathode intake manifold for utilization in the fuel cell. See column 6 lines 1-10.

### ***Response to Arguments***

9. Applicant's arguments filed January 12, 2009 have been fully considered but they are not persuasive. *Applicant's principle arguments are:*

*a) the coolant channels of the prior art do not extend transversely to the stack axis.*

10. In response to Applicant's arguments, please consider the following comments.

a) The cooling channels comprise a serpentine configuration (a direction of flow of one of said channels is opposite to a direction of flow of an adjacent one of said channels). See figure 6. Each channel having two open ends (206, 206', 614, 618). See figure 6. Vitale does not disclose an axis for the fuel cell stack. However, an axis is based upon the plane of reference. Therefore, it can be concluded that the fuel cell stack is stacked along the x-axis and the cooling channels disclosed in figure 6 extend transversely to the stack axis in the z-axis direction. See figure 6.

### ***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 1795

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYANT SUITTE whose telephone number is (571)270-3961. The examiner can normally be reached on Mon-Fri 10-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRYANT SUITTE/  
Examiner, Art Unit 1795

/PATRICK RYAN/  
Supervisory Patent Examiner, Art Unit 1795